CLAIMS

What is claimed is:

1. An electronic control unit having a flexible circuit board assembly comprising:

a flexible circuit board having a first portion and a second portion separated by a bendable region; and

a substantially rigid substrate having a first portion and a second portion separated by a bend region, the rigid substrate having an inside surface and an outside surface, the first and second portions of the circuit board being affixed to the respective first and second portions of the substrate, the bend region having a recess extending outwardly from the inside surface of the substrate with the recess sized to accept the bendable region of the circuit board.

2. The control unit of claim 1, wherein the first and second portions of the circuit board and the substrate are bent at less than a one hundred eighty degree angle to each other as measured from the inside surface.

3. The control unit of claim 2, wherein the bendable region of the circuit board in the recess of the substrate has a single bend radius of no less than three millimeters.

4. The control unit of claim 2, wherein the bendable region of the circuit board in the recess of the substrate has a single bend radius of no less than five millimeters.

5. The control unit of claim 1, wherein the bend region of the substrate has a width between the first and second portions of not more than ten millimeters.

6. The control unit of claim 1, wherein the circuit board is a multilayer circuit board formed with conductive traces, conductive vias, and conductive pads for securing and interconnecting electrical components thereto.

7. The control unit of claim 1, wherein the circuit board is composed of multiple layers of a glass weave impregnated with an epoxy resin.

8. The control unit of claim 1, wherein the bend region is substantially coplanar with a longer of the first and second portions of the substrate.

9. An electronic control unit having a flexible circuit board assembly comprising:

a flexible circuit board composed of multiple layers of a glass weave impregnated with an epoxy resin and having a first portion and a second portion separated by a bendable region, the circuit board being formed with conductive traces, conductive vias, and conductive pads for securing and interconnecting electrical components thereto; and

a substantially rigid substrate having a first portion and a second portion separated by a bend region, the rigid substrate having an inside surface and an outside surface, the first and second portions of the circuit board being affixed to the respective first and second portions of the substrate, the bend region having a recess extending outwardly from the inside surface of the substrate with the recess sized to accept the bendable region of the circuit board, and

the first and second portions of the circuit board and the substrate are bent at less than a one hundred eighty degree angle to each other as measured from the inside surface.

10. The control unit of claim 9, wherein the first and second portions of the circuit board and the substrate are bent at approximately a ninety degree angle to each other as measured from the inside surface.

11. The control unit of claim 10, wherein the bendable region of the circuit board in the recess of the substrate has a single bend radius of no less than three millimeters.

12. The control unit of claim 9, wherein the bend region of the substrate has a width between the first and second portions of not more than ten millimeters.

13. The control unit of claim 9, wherein the bend region is substantially coplanar with a longer of the first and second portions of the substrate.

14. A method for forming a circuit board in an electronic control unit assembly, the method comprising the steps of:

providing a substantially rigid substrate having a first portion and a second portion separated by a bend region and a flexible circuit board having a first portion and a second portion separated by a bendable region;

forming a recess in the bend region of the substrate extending outwardly from an inside surface thereof with the recess sized to accept the bendable region of the circuit board;

affixing the first and second portions of the circuit board to the respective first and second portions of the substrate; and

bending the substrate at a junction of the first portion and the bend region of the substrate such that the bendable region of the circuit board deforms into the recess of the substrate.

15. The method of claim 14, wherein the bending step includes bending the substrate such that the first and second portions of the circuit board and the substrate are bent at less than a one hundred eighty degree angle to each other as measured from the inside surface.

16. The method of claim 14, wherein the bending step includes bending the substrate such that the bendable region of the circuit board in the recess of the substrate has a bend radius of no less than three millimeters.

17. The method of claim 14, wherein the providing step includes providing the bend region of the substrate with a width between the first and second portions of not more than ten millimeters.

18. The method of claim 14, wherein the providing step includes providing a multilayer circuit board composed of multiple layers of a glass weave impregnated with an epoxy resin formed with conductive traces, conductive vias, and conductive pads for securing and interconnecting electrical components thereto, and further comprising the step of solder reflowing components to the circuit board.

19. The method of claim 14, wherein the bending step includes bending the substrate such that the first and second portions of the circuit board and the substrate are bent at approximately a ninety degree angle to each other as measured from the inside surface.

20. The method of claim 14, wherein the affixing step includes the substeps of applying an adhesive to the inside surface of the flat substrate and mounting the flexible circuit board flat on the surface of the substrate.